

Rabies Outbreak in Imperial County

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MEASURES to control an outbreak of rabies in the Imperial Valley of California are an example of what a community can accomplish in the face of a serious threat to public health. In the valley and in the neighboring Mexican State of Baja California del Norte, 438 animals were pronounced rabid, and 1,894 persons reported animal bites, with more than 1,000 receiving antirabies treatment, during a 14-month period in 1959-60 (1-3).

A citizens action committee for rabies control, an intensive health education program, emergency dog-vaccination clinics, and strict quarantine regulations with severe penalties for violations helped to turn public apathy, resentment, and later fear into cooperation. Among the forces marshaled against the outbreak were an array of organizations ranging from the farmers association and the parent-teacher associations through city, county, State, and national government agencies to the Pan American Sanitary Bureau.

The origin of the disease outbreak and the exact number of animals dying of rabies are unknown. A rabid coyote, killed recently at Jacunba, San Diego County, near the area where the first rabid dog in the epidemic was identified, points to the predatory animal population as the source.

The geography of the Imperial Valley and the contiguous Mexicali Valley, which has essentially the same topography, climate, natural boundaries, irrigation systems, and predatory

animal habitats, supports this theory. The riverbeds of the New and Alamo Rivers, stretching north from the United States-Mexico border through the Imperial Valley to the Salton Sea, are covered with heavy vegetation and form excellent retreats for predatory animals. East and west of the irrigated area of the valley are unpopulated desert wastelands and mountainous terrain.

There had been no effective predatory animal control in Imperial County for several years before the outbreak. The coyote, fox, skunk, and feral dog populations were inordinately high east and west of the valley and in the two riverbeds.

Prior to the epidemic, the most recent cases of rabies in the Imperial Valley had occurred in two feed-lot cows in April and May 1958 in the Calexico area. A rabid bat was reported from Winterhaven in December 1958. The most recent case of rabies identified in Baja California had occurred in 1953. During August and September 1959, health authorities in Mexicali noticed a considerable increase in the number of persons bitten by dogs, and on September 17 the first case of canine rabies proved by laboratory test was identified in Mexicali.

The first rabid dog in the Imperial Valley was identified by laboratory test on September 9, 1959, although a dog that acted strangely was observed on September 1 by a person who had previously seen canine rabies. This animal was shot but no laboratory tests were made. The severity of the epidemic gradually increased on both sides of the border from September to a peak incidence in November-December (tables 1 and 2).

Initial Control Measures

Under provisions of the California Health and Safety Code (4), on November 4, 1959,

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the Region I Advisory Committee, California State Department of Public Health, declared Imperial County a rabies area, effective December 2, 1959. Section 1920 of the code requires that all dogs 4 months of age or older be licensed and vaccinated against rabies, and that dogs under 4 months of age be confined. It also requires the governing bodies to provide a pound and pickup system to enforce the provisions of section 1920, and to provide for low-cost public vaccination clinics.

With seven cases of rabies confirmed by laboratory examination, Dr. Austin W. Matthis, then county health officer, on November 5, 1959, declared a 60-day quarantine of all dogs in the portion of the county south of U.S. Highway 80, including the city of El Centro (see map).

Three days earlier, Calexico officials warned citizens to keep their dogs in quarantine and began to destroy all stray dogs on the city streets under provisions of the city's dog control ordinance. Public criticism was vociferous and reached extremes when several dogs were reportedly shot in view of children on their way home from school. However, one dog, shot on November 5 as it approached a school ground, was proved rabid on laboratory examination. A total of 138 dogs were shot in Calexico by December 14, and through May 25, 1960, 451 dogs (125 were considered clinically rabid and 8 confirmed by laboratory examination) were killed in the Calexico area (1).

Subsequent events proved the wisdom of Calexico's action, and when the magnitude of the outbreak was realized, there was general public acceptance. In retrospect, there is no doubt that action by the city from November 3 through December 18 was a major factor in

containing the outbreak and slowing the spread of the Imperial Valley phase pending ultimate action by the rest of the county.

On request of the health officer, Dr. Humphrey visited Imperial County on November 18 and recommended that the quarantine area be extended, that emergency dog-vaccination clinics be held, and that control measures for predatory wildlife be started along the international border and adjacent to the quarantine area. The county board of supervisors appropriated funds for setting up poison-bait stations, for a small dog pound, and for hiring an assistant to the county poundmaster. The city of El Centro and other urban communities also appropriated funds for dog pounds.

Between November 1 and December 10, 1959, the incidence of reported dog bites, the number of animals submitted for examination by the county health department laboratory, and the number of persons placed under Pasteur treatment showed an alarming increase.

On December 12, 1959, Dr. Hebert, who had become county health officer on December 1, extended the quarantine. It remained in effect in the entire county until April 14, 1960, and in the southern portion until June 14, 1960.

Emotional aspects often were important factors both in the lack of public cooperation and in the eventual control of the outbreak. For example, a father rushed out of his house, shotgun in hand, shot the family cat, and unwittingly hit his son in the legs with pellets which had passed through the cat's brain. The animal had been behaving strangely prior to the shooting. The child received antirabies vaccine.

Fear, superstition, and misinformation

Table 1. Rabies outbreak in Imperial County, Calif., September 1959–March 1960

Persons and animals affected	September	October	November	December	January	February	March–April	Total
Persons reporting animal bites.....	0	0	0	118	69	25	18	230
Persons given antirabies vaccine.....	0	0	0	74	30	0	0	104
Rabid animals (laboratory confirmed).....	2	3	9	15	8	1	2	40
Rabid animals (clinical diagnosis).....	1	0	0	65	69	13	1 30	178

¹ These 30 dogs, judged rabid by Calexico officials, were destroyed. None were known to have bitten Calexico residents. They were thought to be animals which had crossed the border, since most were shot or picked up within 1 or 2 blocks of the port of entry.

Table 2. Cases of animal rabies by species, Imperial County, Calif., August 28, 1959–October 31, 1960, and Mexicali, Mexico, September 17, 1959–October 29, 1960

Rabid animals, by species	Total cases	Imperial County	Mexicali
Total.....	438	219	219
Laboratory confirmed.....	119	142	77
Dog.....	109	238	71
Cat.....	4	0	4
Cow.....	3	2	1
Horse.....	2	2	0
Squirrel.....	1	0	3 ¹
Clinically diagnosed.....	319	177	142
Dog.....	303	166	137
Cat.....	5	0	5
Cow.....	11	11	0

¹ Only laboratory-confirmed cases were reported on State health department form ACD-77.

² Nine cases originated from Mexicali.

³ Pet squirrel.

SOURCES: Reference 2; California State Department of Public Health, Epidemiologic report of a case of animal rabies, form ACD-77; Report from Imperial County Health Department; and Servicios Coordinados de Salubridad y Asistencia, Baja California del Norte, Mexicali, Informe semanal de epizootia rabia en Mexicali, del 14 de diciembre de 1959 al 30 de octubre de 1960.

were evident during the worst of the outbreak. An assortment of animals from mice to muskrats were submitted to the laboratory for examination with vociferous demands for immediate diagnosis. The health officer and his staff were plagued with countless telephone calls of outlandish purpose. Conflicting stories and false rumors, such as the "discovery" of 27 dogs in a railroad freight car which was about to leave the county, hindered control efforts and occupied the time of harried health department and law enforcement personnel and the county livestock inspector.

Numerous pet dogs and cats were dumped from automobiles in isolated areas by misguided owners instead of submitting them to more humane disposal. In the end, however, sanity prevailed, principally attributable to the effective public education program.

The first week in December, news releases to alert the public to the dangers of rabies were issued to radio, television, and newspaper media. The postexposure treatment schedules of the World Health Organization were mailed

to all members of the county medical society. On December 15, in view of the worsening character of the epidemic, the Imperial County district attorney and the health officer appealed to Gov. Edmund G. Brown and to Dr. Malcolm Merrill, director, California State Department of Public Health, for help. A team of seven persons from the State department of public health staff was dispatched to El Centro, and Dr. James Coccozza, a veterinarian of the Pan American Sanitary Bureau, was recruited to aid and advise the Mexican health authorities. He received the willing cooperation of Dr. Victor Ocampo Alonzo, then health officer of Baja California.

Citizens Committee

A coordinated, countywide rabies control effort was initiated in mid-December. The county board of supervisors was again apprised of the seriousness of the outbreak and 50 law enforcement, county, city, and State officials and private citizens met on December 16. They represented the Farm Bureau Federation, civil defense, superintendent of schools, county farm adviser, agricultural commissioner, district attorney's office, county livestock inspector, municipal authorities, health department, the cattle industry, farming, urban dwellers, and the press. The result of the meeting was an acceptance of the gravity of the outbreak and a unification of official opinion and efforts for its control.

The Imperial County Citizens Action Committee for Rabies Control was organized 2 days later at a meeting called by the health officer. Its chairman was the director of the University of California Agricultural Extension Service for Imperial County. The first meeting was attended by 20 persons representing all official agencies concerned with the rabies outbreak, the parent-teachers association, county school system, farm bureau, service clubs, women's organizations, and livestock and farm groups.

The citizens action committee agreed that all law enforcement agencies were to begin immediately destroying all stray dogs and issuing citations for violations of the quarantine order. A meeting was held with the district attorney and the county superior court judges, who

agreed that severe penalties would be invoked for violation of the quarantine requirements, including nonvaccination of dogs and failure to control or confine privately owned dogs. They agreed that bail would be set at \$105 for persons cited for violations of quarantine, licensing, and vaccination.

The formation of the citizens action committee marked the beginning of an all-out effort to control the epidemic. A program of public information organized by Alton Wilson, health educator, California State Department of Public Health, played a major role in turning public apathy, indifference, and resentment into a spirit of cooperation and recognition of the role of the community and the individual dog owner in control of the outbreak.

Films provided by the State department of public health, division of health education, were shown to citizen groups and through the schools.

The health officer, the health department sanitarians, the county livestock inspector, and the chairman of the citizens action committee presented lectures and led community discussion groups to educate the public regarding the disease and the necessary measures to control it. The committee raised funds through voluntary donations to print and distribute 25,000 pamphlets which explained rabies and its control to the public (see illustration).

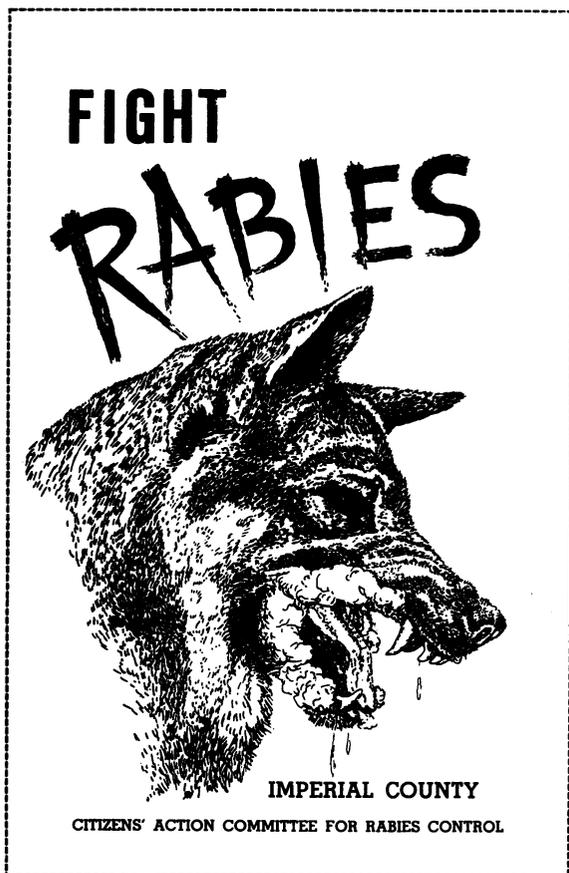
Other Control Measures

The county agricultural commissioner, cooperating with the State department of agriculture and the U.S. Fish and Wildlife Service, began countywide control of predatory wildlife. A total of 188 bait stations were placed, supplied with 4,400 baits at all times. Animals in the county accepted 11,400 poison baits.

At the same time, the civil defense office recruited approximately 250 men who were instructed to canvass the entire county and to shoot on sight any dog not restrained on a leash or otherwise confined. A total of 1,045 stray or wild dogs were destroyed. An additional 3,214 dogs were destroyed through routine pound operations, making a total of 4,259 animals destroyed by mid-January 1960. The city of El Centro reported in June 1960 that 709 dogs and 730 cats had been destroyed since October 1, 1959 (5).

On December 18, 1959, the county board of supervisors passed a resolution urging that every public agency and its officers and employees take all available steps to stop the spread of the epidemic by destroying dogs running loose in violation of the rabies quarantine and by filing complaints against persons who permitted their dogs to run loose at any time, and who failed to have their dogs vaccinated and licensed.

In addition, the board of supervisors allocated \$3,475 for materials and construction of gates on the crossings of the All-American Canal to prevent movement of dogs to and from Mexico. The gates were completed in mid-January 1960. Four- by eight-foot signs posted on all highways and roads entering Imperial County notified travelers of the rabies outbreak and quarantine. Assistance was also requested



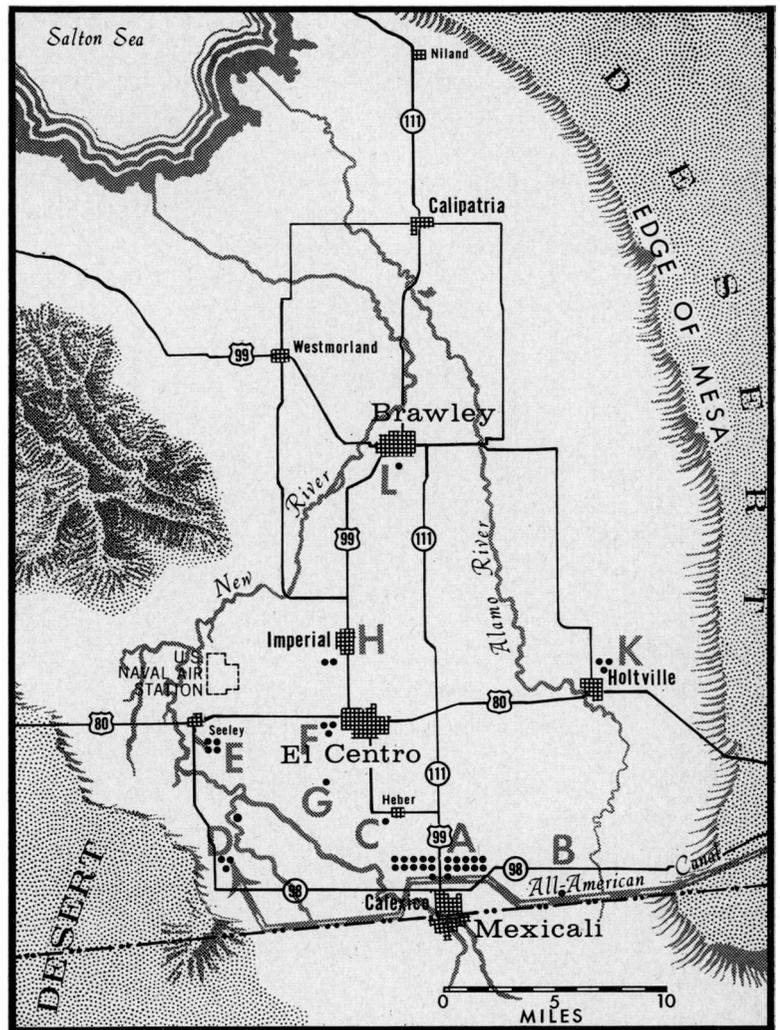
Pamphlet distributed by Imperial County citizens committee

LABORATORY-PROVED RABID ANIMALS
in
IMPERIAL VALLEY
CALIFORNIA

August 28, 1959—October 31, 1960

Each dot represents 1 rabid animal
(38 dogs, 2 cows, 2 horses)

<i>Chronology of cases</i>	<i>Area</i>	<i>Chronology of cases</i>	<i>Area</i>
1	E	22	A
2	D	23	A
3	A	24	F
4	G	25	A
5	H	26	K
6	F	27	D
7	A	28	A
8	A	29	A
9	E	30	A
10	A	31	A
11	A	32	A
12	F	33	A
13	C	34	D
14	A	35	B
15	A	36	A
16	H	37	A
17	A	38	A
18	K	39	A
19	K	40	A
20	E	41	D
21	L	42	E



from the plant quarantine station of the State department of agriculture at Yuma, Ariz., to restrict movement of dogs.

A series of low-cost dog-vaccination clinics in rural and urban areas was conducted by Dr. G. K. L. Knott, the county livestock inspector, and private veterinarians. The location and time of vaccination clinics was coordinated with a house-to-house canvass of dog owners in all urban and rural communities. The police, fire, and pound personnel conducted the canvasses in the cities. The Imperial County Farm Bureau canvassed the unincorporated areas. Mimeographed notices allowing 5 days for compliance were issued to all owners whose pets were either unvaccinated or unlicensed.

Spot surveys covering several hundred homes

each were conducted by the division of sanitation of the Imperial County Health Department in various areas to determine the effectiveness of the house-to-house canvass and the vaccination clinics. By January 15, 1960, a total of 7,782 dogs had been vaccinated, or 95 to 97 percent of the privately owned dogs of Imperial County.

The response to these various measures was effective. Virtually all stray dogs in the county had been eliminated, and almost all privately owned dogs were being restrained. The number of reported animal bites and the number of dogs submitted to the laboratory for examination were reduced to a trickle. By mid-January the epidemic was not an epidemic. No animal identified as native to Imperial County was

diagnosed as rabid either by clinical or laboratory examination for nearly 11 months.

However, on December 7, 1960, in Bard, a stray dog bit a 76-year-old man on the right wrist. The dog was shot after the attack and the State department of public health laboratory found Negri bodies on microscopic examination of the dog's brain. The man received a 14-dose course of duck embryo vaccine. He became ill 31 days later and died on January 20, 1961. Microscopic examination of his brain revealed typical Negri bodies (6).

Control Measures in Baja California

During June, July, and August, 1959, some 2,800 dogs were immunized in small communities east of Mexicali with a chick embryo vaccine produced in Mexico City. The vaccine lot, however, was later reported to be nonpotent (2). A number of the rabid dogs found in Mexicali had been vaccinated and one of the rabid stray dogs found in Imperial County during the outbreak bore a Mexican vaccination tag issued during the June-August 1959 immunization program.

Because a potent rabies vaccine was not available during the course of the outbreak in Mexicali, the Pan American Sanitary Bureau provided 5,000 doses of chick embryo vaccine from the United States to Mexicali authorities on December 23, 1959. An additional 10,000 doses of vaccine from the United States were supplied through the U.S. International Cooperation Administration on January 13 and 18, 1960.

On January 13, 1960, mass free antirabies vaccinations were initiated through the Mexicali school system and some 8,000 animals were given injections during a 5-day period. Mexicali authorities were assisted by a veterinarian and a physician from the Mexican Federal Ministry of Health, Mexico City, and by veterinarians from the Pan American Sanitary Bureau, the Public Health Service, and the California State Department of Public Health. During the clinics, the vaccination team personnel observed clinical cases of rabies in dogs either loose on the streets or in animals brought to the health department by their owners. In

the Mexicali area local authorities continued vaccinating through March 12. Approximately 13,687 animals were immunized (3).

The Pan American Sanitary Bureau supplied 10,000 doses of chick embryo rabies vaccine from the United States to the Tijuana Health Department, and a program of pay vaccination clinics (10 pesos or approximately 80 U.S. cents) began on February 1. It is understood a total of 8,050 dogs were immunized as of August 27, 1960, in Tijuana, 720 in Tecate, and 820 in Ensenada.

As the result of the continued occurrence of rabies in the Mexicali area during March and April 1960 (50 cases, 13 confirmed by laboratory examination), Mexicali authorities again held free canine-vaccination clinics on May 9, 1960. Some 3,400 animals were reported vaccinated in the subsequent 25-week period through October 29 by Mexicali authorities. Another 1,242 dogs were reported vaccinated from November 14 to 19 (3).

At the time immunization was reinitiated in May in Mexicali, Baja California officials requested additional vaccine through the Pan American Sanitary Bureau and received 10,000 additional doses from ICA on June 6, 1960.

Some 35,000 doses of canine chick embryo vaccine were available for use in Mexicali and the northern part of Baja California from December 23, 1959, to June 6, 1960, and a total of 29,867 animals had apparently been immunized through November 19, 1960.

Limited destruction of dogs was attempted in Mexicali during the initial stages of the outbreak. It was reported that 1,611 animals had been destroyed during November (2) and an estimated 1,300 more in an attempt at large-scale destruction on the night of December 17, 1959. Limited canine destruction was continued through March 5, with an additional 2,801 dogs reported destroyed (3).

However, public and newspaper opinion against the step became so intense that destruction had not been resumed as of October 29, 1960, despite real need for this measure. The fact that there had been no restriction imposed against dogs in the streets and no effective reduction in dog population had undoubtedly contributed to the continued occurrence of canine

cases in the Mexicali area through November 12, 1960, in contrast to the abatement of the disease in the Imperial Valley in January 1960 (1).

Rabies Control Ordinance

The temporary citizens action committee in Imperial County was officially dissolved in mid-March 1960 and replaced by a permanent rabies control council. Its chairman is the county health officer and members are the county veterinarian, the county agricultural commissioner, and two members of the general public, one representing the sporting-dog groups and the other the livestock industry.

The council's status became official under a county ordinance adopted December 19, 1960, providing for the control, prevention, and eradication of rabies and the vaccination and licensing of dogs (7).

The ordinance establishes an annual rabies control period from January 16 to March 1. All dogs and cats are quarantined during this time; stray dogs and cats are to be captured, impounded, and destroyed; and an intensive, predatory animal control program is to be conducted by the county agricultural commissioner in cooperation with Federal and State agencies. Other provisions require that all dogs over 4 months of age be vaccinated and licensed annually and that the county veterinarian conduct a yearly series of low-cost vaccination clinics.

One section of the ordinance sets up a rabies eradication fund to which license fees and fines

arising from violations of the ordinance are devoted. It also provides that at least \$1,000 be allocated each year for an annual education and publicity campaign "to instruct the general public concerning the legal requirements and purpose of vaccination and licensing of all dogs."

The rabies control council and the annual control period set up by the ordinance are unique in California. It is believed that similar programs could be effectively carried out in many other counties.

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- (3) Servicios Coordinados de Salubridad y Asistencia, Baja California del Norte, Mexicali: Informe semanal de epizootia rabia en Mexicali, del 14 de diciembre de 1959 al 19 de noviembre de 1960.
- (4) California Health and Safety Code. Secs. 1901.2 and 1920.
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- (6) California State Department of Public Health: California surveillance report. Rabies Report No. 2, February 1961, pp. 1-2.
- (7) Imperial County, Calif., Board of Supervisors: Ordinance No. 251.